5.0 EXISTING CONDITIONS

5.1 INTRODUCTION

The condition assessment component of this HSR began prior to the actual site work with a review of the existing documentation and discussions of the issues with project manager Edna Kimbro. The fieldwork began with a general survey of the site for the purpose of developing an understanding of the primary issues. That took place during the afternoon of April 2, 2003. The fieldwork was completed on Sunday April 6 with a brief review of the site. The main investigations took place on April 3, 4, and 5.

Present during the fieldwork at various times were other members of the HSR team including Elizabeth Moore, Karen Hildebrand, Edna Kimbro, and consultant Roy Tolles of Earthen Building Technologies. Dr. Tolles is the HSR consulting engineer addressing seismic retrofitting treatments. Jim MacKenzie, Preservation Specialist of California State Parks, assisted the HSR team.

The treatment recommendations that follow the assessment are associated with the condition of the structures. Other factors addressed in other parts of the HSR will expand the overall recommendations to address future use and interpretation that will result in the overall treatment recommendations.

5.2 METHODOLOGY

Fieldwork concentrated on developing an understanding of the material and systems used in the structure and the condition of those materials and systems. An area of the foundations was excavated subsequent to this site visit and the information supplied by Karen Hildebrand.

The investigation, the analysis of the factors resulting in deterioration, and the treatment recommendations are based on somewhat limited fabric investigation. Additional wall and foundation investigation by selective excavations, limited removal of wall plasters and stuccos, and wall probing would have added to the information. Because of these limitations, certain assumptions are made that should be confirmed with additional investigations in the future before the comprehensive designs for the rehabilitation are completed.

Information during all the site work was recorded and conditions were documented on field notes, videotapes, digital photography, and film photography.

5.3 SITE

5.3.1 General Description

The overall landform in the area of the Castro Adobe slopes from west to east, although the immediate site is relatively flatter for the most part. There is a slope on the south side and off the southeast corner to the south and the southeast. A low masonry wall is located east of the east side and the area between it and the adobe is flat. The slope on the east of this low wall drops again slightly as it again conforms to the natural slope of the land. A chain-link fence provides security to the immediate site. A wood fence separates the area west of the house and the area is accessible only from the north side near the northwest corner of the house.

A small shed of stabilized adobes is immediately north of the adobe and just outside the chain-link fence. Several fruit trees from an orchard are north of the shed.

The rear, or west yard was formally landscaped in the past and while not of the significant historic period does provide a separation from the modern roads and houses beyond. Figure 5.1 is a view of the landscaped grounds west of the adobe. Figure 5.2 is a view of the east side of the adobe from the northeast.

Figure 5.1: A composite view of the gardens of the Castro Adobe from the west side of the immediate property. Digital photograph by A. Crosby, April 2003.

Figure 5.2: A view of the adobe from the northeast. The cocina is the lower extension to the right. Digital photograph by A. Crosby, April 2003.

5.4 CASTRO ADOBE / STRUCTURE

5.4.1 Typical Problems of Adobe Preservation

Beginning with the first restoration phase the integrity of the adobe materials and the adobe structural system is the first priority for the continued preservation of the structure. A complete understanding of the condition of all the adobe materials in the structure is not possible, but there are critical issues upon which the overall integrity is based. One critical issue is the lower portion of the adobe walls where the weight of the entire structure is concentrated. The loss of structural integrity at the lower wall could result in the complete loss of an entire wall. A primary issue is the effect of a traumatic loading on the structure, such as would occur in a seismic event. Other parts of the adobe wall system that are in poor condition, because of the effects of moisture, previous settlement, or existing structural cracking would also be affected more.

Adobe is a material formed by the interlocking of grains of sand by clay platelets. The dehydration of water when the molded adobes are dried in the sun is a physical, not a chemical change. Consequently, adding water, (hydrating) to the adobe brick can essentially reverse the results of the dehydration process, which forms the earth material into a cohesive building block. The process also happens unintentionally as the re-hydration process occurs when water gains access to the adobe material as a result of rainfall, surface runoff, subsurface water, irrigation, or some other source of free moisture. Water molecules either accumulate between the clay platelets, or they attach themselves to the platelets. As this process continues, the mechanical properties of the adobe, the compressive and tensile strengths, are reduced dramatically (Torraca 1981: 93-94; Houben 1994:20-33).

Another characteristic of typical adobe material is that the vehicle for the transport of water in the material, capillarity, is less strong than in other porous materials such as sandstone. Consequently, rainwater falling on the surface of adobe does not penetrate into the mass of the material, and it dries quickly. However, if the source of water is more constant, water can penetrate into the mass of the material and affect its performance. An adobe wall subjected to constant groundwater or ponding, because of improper surface drainage, will draw water into it through capillary action and lose compressive strength quickly. As the bearing capacity is reduced, depending on the loads on the wall, the material will begin to compress, the wall will settle and wall cracks will appear that are characteristic of settlement. If the source of the water remains, the moisture content of the material will continue to increase until the lower part of the wall can no longer carry any load, even its own weight, and the wall could collapse.

It has been demonstrated that even a minimal amount of moisture will dramatically affect the strength of adobe (Clifton, 1979:10). The compressive strength of certain stones used as foundation materials at the base of the walls is also reduced when wet, but much less so than adobe. Even saturated, the stone can still carry any normal structural loads that it is subjected to. The specific constituents of the soil will determine the resistance of the individual adobe to water, but even a clay-rich adobe mix will lose more than half its strength with a moisture content of only 10%. If water continues to be available, the moisture in the adobe will increase and the structural integrity will be even further compromised.

Figure 5.3 is a sketch showing a typical condition of the failure of an adobe wall from the presence of moisture at its base. In the sketch on the left the base of the wall begins to erode from capillary moisture and normal wall splash. As shown in the center sketch, a typical repair consisted of a concrete curb or counter wall, which forced capillary moisture higher in the wall. Hard impervious stucco will have much of the same effect. At the same time a concrete slab was added to the interior forcing even more moisture into the adobe wall, causing additional decay at the base of the wall and above the concrete curb. Further repair using more impervious materials forced the moisture higher, while increasing the overall moisture content and reducing the strength of the adobe. The sketch on the right shows the greater amount of moisture and the slumping and bulging of the wall as it looses its ability to support the weight above. At this point, which may be immediately before the wall fails completely, there is relatively little visible evidence of the actual condition.

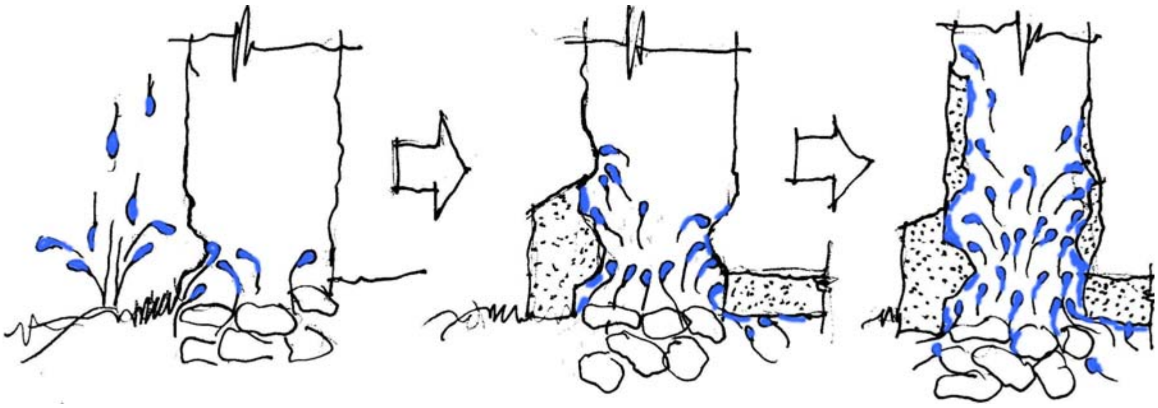

Figure 5.3: Sketch of a typical process of failure of an adobe wall from capillary moisture gaining access to the base of the walls followed by inappropriate repairs that exacerbate the problem.

In addition to the direct effect of water in reducing the strength of adobe, water causes decay in less direct ways as well. One example is the decay mechanism and damage caused by the expansion of soluble salts as they expand during dehydration. The forces caused by the expanding salt crystals exert tremendous pressures and disrupt nearly any material. The decay normally occurs at or near the actual surface of the material that is exposed to evaporation. With adobe the decay occurs deeper into the material than it does with porous stones. The basal erosion and the friable adobe on the interior of some of these adobe walls are at least partially caused by these salts.

All of these specific results of decay mechanisms often are exacerbated by relatively impervious protective coatings on adobe walls and walls of other masonry materials that do not allow the material to dry when it becomes wet. The normal capillary rise in an adobe wall is approximately two feet high, even if there remains a constant water source; the normal rise in a sandstone wall, for example, can be several times that. The water can rise much more if the wall surfaces are covered with a material such as a Portland cement plaster, which is relatively impervious. Other traditional surface renders, such as mud or lime plasters do not have the same effect because they are far less restrictive on the normal evaporative processes.

Even with the reduction of half of its compressive strength by the access of moisture, under conditions of normal building geometry loading, a typical adobe building system will be stable. Moderate dynamic loading on a structure that is in good condition will possibly result in some damage, but the structure will probably survive. But, the combination of a structure that has been weakened by moisture and subjected to a moderate seismic event can result in traumatic failure.

While adobe does decay at a faster rate than most other porous materials, it is affected by the same factors. The key to preservation is (1) to protect both the bases and the tops of walls from water infiltration, (2) to keep water from concentrating in small areas, (3) to allow the material to dry when it becomes wet, and (4) to prevent the constant moisture source.

5.4.2 Basic Characteristics of the Castro Adobe, the Building Materials and Building System

The Castro Adobe is a two-story adobe structure and a one-story adobe extension to the north. It is approximately 87 feet long and 27 feet wide. The one-story addition on the north, the cocina, was added to the basic two-story structure as the adobe masonry at intersection of the east and west walls of both sections are butt jointed, rather than integrated in the same coursing pattern. In all probability the cocina was added at or immediately after the construction of the main portion of the adobe. Both have gable roofs (Figure 5.3). An open shed (carport) is still another north extension, but it is not part of the original configuration. A two-story corredor is on the east side and a full height corredor is on the west side.

There is access and egress on the first floor through the east cocina doors, double doors in the main room on the east and three doors on the west side. Access to the second floor is an interior stair, a later addition, and a set of double doors on the east accessed from the exterior corredor stairs. Currently there is no access to the building for the mobility impaired.

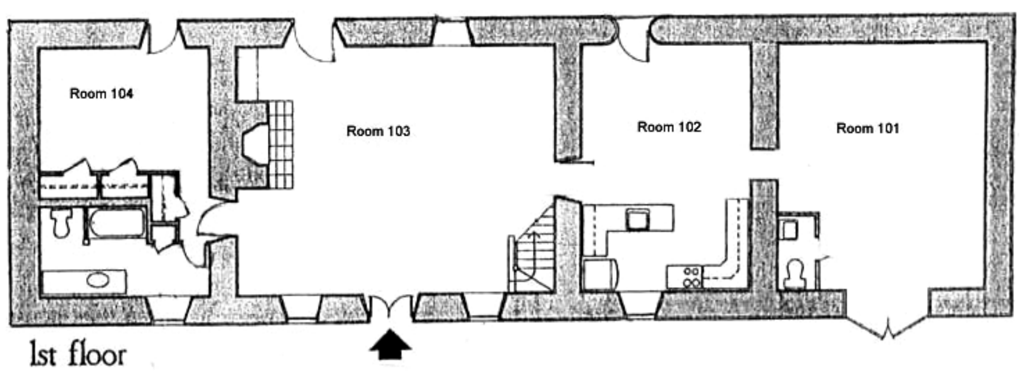

Figure 5.4: Castro Adobe, simplified first floor plan. This version does not include the east and west corridors or the carport addition on the north. The top of the plan is west.

The adobe walls are on foundations of cobbles. A section was exposed on the west wall. At this location the foundation was 14 inches high with the base approximately 6 inches below the floor of the corredor. The foundation on the south wall can be seen in photographs taken when the area was excavated and structural repair undertaken. It is assumed that the 14 inch depth if the foundation is consistent.

The floors are wood with some of the original wood flooring remaining. Some replacement wood is attached with finish nails and non-historic cut nails. The original floor is attached with face nailed cut nails. The floor system was exposed in the main downstairs room and what appeared to be the original floor joists were still in place, set on masonry shims and small piers; they were not set into the adobe walls.

The interior wall surfaces are various types of plaster. Mud plaster was the initial surface treatment, followed by lime plaster, followed by a hard gypsum-like plaster applied on a wire mesh lath. The use of this latter surface treatment was used extensively directly over earlier surfaces, apparently part of a major repair effort. The finish treatment was originally whitewash, perhaps tinted whitewash, calcimine paint, and modern paints.

The exterior wall surfaces are combinations of mud plaster and whitewash, lime plaster and whitewash, and cement-based stuccos, used for patching. The original exterior finish was mud plaster. Lime plaster was added at a later time. The plaster was probably added in the 19th century, but can only be accurately dated to 1910, when graffiti of that date was cut into the lime plaster. There is evidence on the east exterior surface that the walls were prepared for the lime plaster by scrapping away the mud plaster.

The first floor ceiling joists span the entire width of 22' – 7" between the east and west adobe walls. The roof system over the two-story structure appears to be original. The roof of the cocina, was apparently raised at the ridge and the side walls so the actual slope may be the same as the original. It is relatively new, having been re-constructed by Watsonville Construction in the 1970s (Kimbro, May 30, 2003).

The entire east corredor was replaced in the 1950s, which replaced the ca. 1890 corredor, which replaced the original. Only one joist end remains of the original corredor joists. The existing joists were spaced as the originals, although they are larger. The existing stair is in the approximately same location as the earliest stair, but not as steep as the original. The west corredor posts are also replaced in the 1950s and rafters were added to extend to the width of the corredor.

The interior stairs and the fireplace in Room 103 were later additions.

5.4.3 Condition of Adobe Wall Systems

The excavation of the foundations and the limited removal of surface finishes on the exterior was important in developing an understanding of the wall systems, although the level of fabric investigation was limited. Equally important was the mapping of surface wall conditions, such as cracks and documenting the actual geometry of the primary walls.

The walls are constructed of 28”x14”x4” adobes and mud mortar. The adobes are dark gray and have higher clay content than the tan mortar. The contrast of the two materials is quite dramatic. The color of the adobes is classified as dark grayish brown (10 YR, 3.5/2) by the Munsell color system. The mud mortar is classified as dark yellowish brown (7.5 YR, 4/4). Figure 5.4 shows a typical exterior surface of exposed adobes.

Figure 5.5: A section of adobe masonry exposed on the east exterior wall. Digital photograph by A. Crosby, April 2003.

5.4.3.1 Foundations

The overall condition of the foundation could not be determined by the limited excavations. In the area exposed it appears to be in good condition. The present condition of the adobe walls does not reflect a foundation problem. However, a major structural intervention of the south wall in the late 1980s was a response to the structural deformation of the wall. It could be that the south wall was constructed on partial fill resulting from the initial leveling of the site and does not reflect a general subsurface problem. This particular type masonry requires some degree of confinement or the small stone will begin to shift and move out of the wall plane, resulting in stress on the walls above. In this case, they are confined by the existing fill and to some degree the existing floors. The only problem that might develop is if the compacted soil was to be removed completely at the base of the foundation. Over time, the stone, particularly if moisture is present, will begin to move as described above.

5.4.3.2 Walls

The four exterior adobe walls are 30 inches thick consisting of 28-inch long adobes and 2 inches of surface plaster. Slight variations exist and are consistent with the expected results from variations in the forms, the curing, and the amount of mud actually placed in the form. As described above the mortar and the adobes were made of quite different raw materials.

The adobe walls are constructed of adobe headers throughout. A header wall is one with the adobes laid across the wall with the width of the adobe visible on the wall face.

The only exceptions are at the corners and openings where the use of stretchers was necessary to insure that there were no stacked mortar joints. The finished width of a header wall would be approximately 1 inch to 2 inches thicker than the length of the adobe, in this case approximately 30 inches thick (28 " + 2"). Both a header wall, and a wall of alternating courses of headers and stretches, the normal alternative, would both be the same thickness.

The adobe walls were damaged extensively by the Loma Prieta Earthquake of 1989, leaving the structure uninhabitable. The main damage occurred to the north and south exterior walls and to the north wall of the cocina. The interior one-story adobe walls between Rooms 102 and 103 and between 103 and 104 were not severely damaged. The long north-south walls were damaged more than the interior walls, but not as severely as the north and south exterior walls. The west adobe wall suffered more in-plane damage than the east.

The south gable wall above the second floor level fell to the south during the event. The wall had been previously stabilized by extensive foundation work and the installation of steel straps at the upper and mid wall point in 1987. There had been previous damage to this wall as evidenced by numerous repairs. In fact, numerous other repairs were identified throughout the structure that no doubt were reactions to previous seismic events. Some of these repairs utilized lime mortars and probably took place during the 19th century. Other repairs utilized more typical 20th century materials. An example is the hard gypsum type stucco and wire mesh lath utilized on the interior.

The most obvious attempts at providing additional strength the structure was the installation of government anchors on the second floor level and a wood timber wall tie at the north gable mid-wall of the second floor. The government anchors were to provide lateral stability to the long two-story east and west walls. The timber wall tie was to provide in-plane stability to the north wall to resist tension stresses in the wall. Each system was an addition to the original structural systems, added during the 19th century. It is not known if they were added at the same time, addressing the same problem, but it is likely that they were.

The government anchors consisted of 5/8 inch steel rods attached to joists with wood compression plates on the exterior wall surface in several locations on both the east and west side. The wood plates were 8 inches square by 1 inch thick with a smaller steel plate and 1 ½ inch nut to secure the steel rods.

The timber wall tie was set into the north wall and extended through the east and west walls. A set of wood wedges on either end of the timber provided the compression bearing plate of the system. A steel bolt set behind the wood wedges kept the main timber from splitting. Figure 5.6 is a photograph and a sketch of the system. The west end on the exterior surface of the west wall is similar in detail.

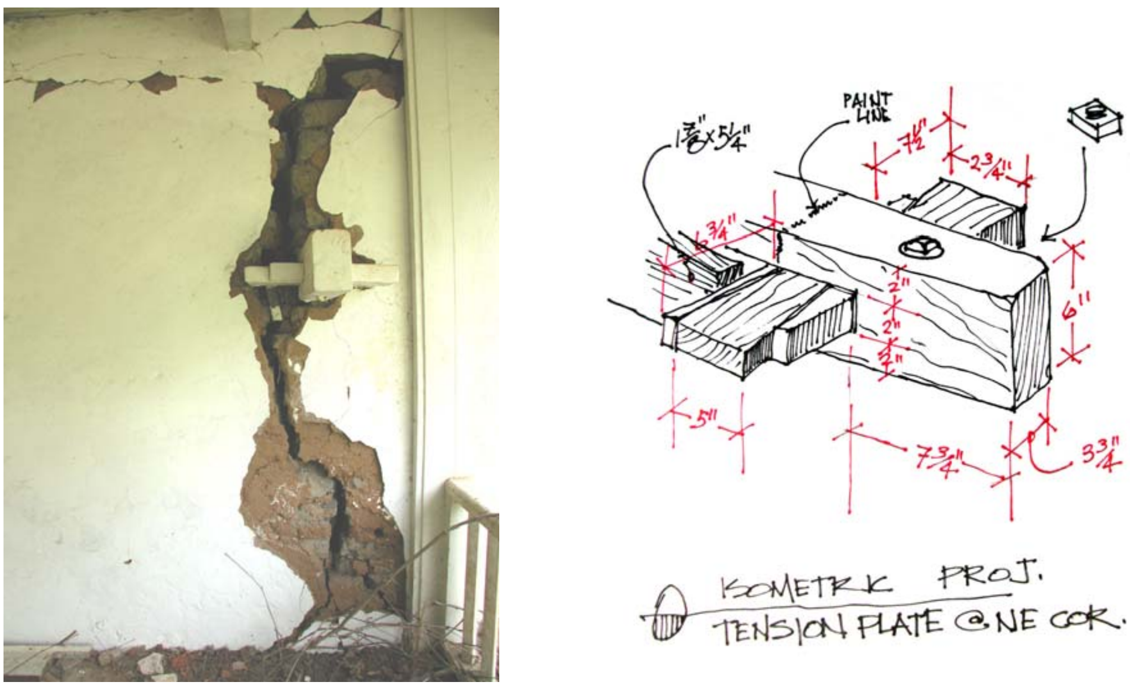

Figure 5.6: Photograph and an Isometric drawing of the timber tension wall tie. This shows the east wall end of the system. Sketch and digital photograph by A. Crosby in April 2003.

The north two-story gable end was displaced to the north approximately 3 inches. The 3-inch gap can be seen on the interior northwest and northeast corners as well as in the east and west wall planes. The wood tie may have provided some resistance to tension stresses, but provided no resistance to the primary north-south ground motion of the Loma Prieta event.

In addition to the displacement of the north wall, a partial section of the adobe gable was knocked out and a vertical wall crack developed on the centerline of the wall. The large timber ridge beam that supports the roof of the cocina probably caused this damage by ramming against the adobe gable during the earthquake. Because of the different roof levels the photograph of the south side of the wall from the attic is above the wall visible from the cocina. The exterior board and batten siding on the gable above the cocina roof prevents observation of the upper part of the gable from the exterior.

The north wall of the cocina was damaged extensively as well. Both the northeast and the northwest corners suffered numerous structural cracks and a section of the northwest corner collapsed. The northeast corner remained intact, but a small section of adobe masonry was also displaced. A long horizontal crack extends nearly the entire length of this north wall with increased displacement from the east end as it approaches the west end at the northwest corner. Figures 5.7 and 5.8 show some of the more severe damage to this wall.

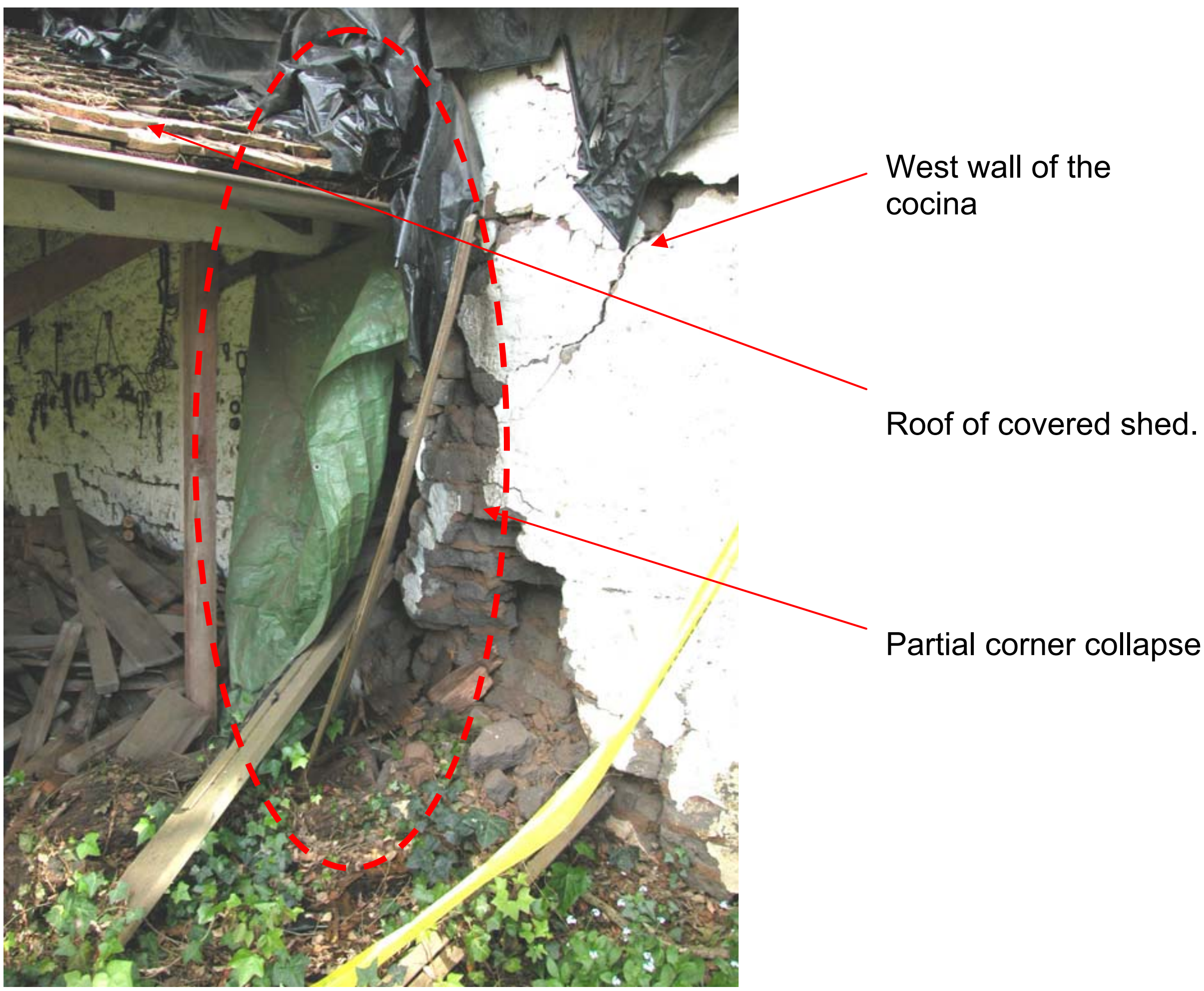

Figure 5.7: The northwest corner of the cocina, Room 101, from the north west. Digital photograph by A. Crosby, April 2003.

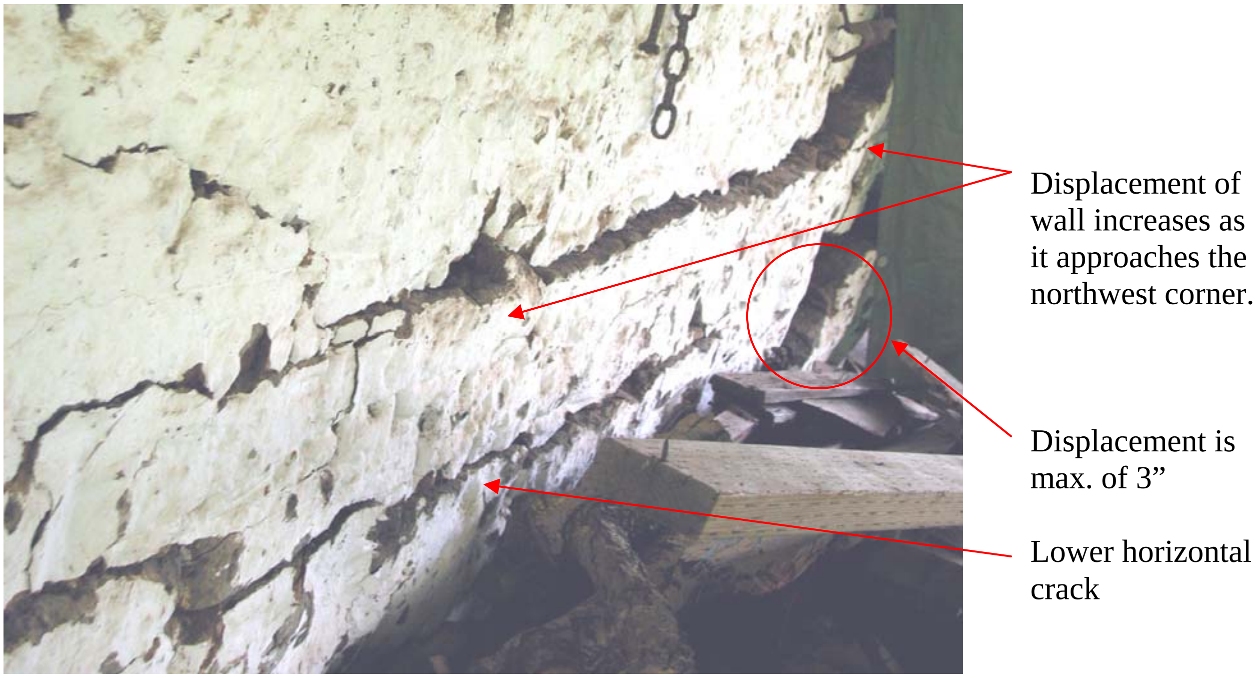

Figure 5.8: Detail of the north wall of the cocina looking toward the northwest corner showing displacement of the wall along the horizontal wall cracks. Digital photograph by A. Crosby, April 2003.

The 1989 earthquake resulted in numerous shear cracks in the east and west walls, but little significant displacement. Figure 5.9 is a typical section of the east wall showing some of the wall shear cracks.

Figure 5.9: A section of the east wall showing a series of diagonal shear cracks. Digital photograph by A. Crosby, April 2003.

In an historic photograph of the east side of the exterior basal erosion is clearly evident. Repairs to the lower part of the wall on both the east and west sides at the base of the walls also shows evidence of lower wall decay. The excavation of the foundation associated with this HSR project revealed a concrete patch at the top of the foundation stones that was probably also a response to lower wall decay. The lower wall decay was the result of lower wall moisture and it may have been an important factor in the deformation of the south wall that resulted in it leaning to the south, necessitating the 1987 structural repair. There is no significant evidence that there is an existing lower wall moisture problem.

Most all of the walls lean, but none to any significant degree. Even the north and south end walls, the ones that show the most damage are relatively plumb. The greatest lean measured was in the north wall of Room #102, the present kitchen of 3/8" to the north and the exterior south wall of ½" per foot. These were both on the first floor. Interestingly, the same north wall did not lean at all on the second floor level, although it had moved approximately 3 inches to the north. The gable roof of the cocina probably provided some lateral support although it also caused damage by ramming into the adobe wall.

5.4.4 Summary of the Condition of the Adobe and Stone Wall Systems

As mentioned previously, the actual fabric investigation was limited. There is no significant evidence of compression at the base of the adobe walls due to moisture intrusion. There are no extensive bulges in the plaster, or crack patterns that reflect localized lower wall failure. The walls all lean to some degree, but the extent is certainly not dramatic and is many cases, the walls might have been constructed with these or similar lean.

The evidence of deterioration is primarily related to the effects of the Loma Prieta earthquake and from previous earthquakes and the current pattern is consistent with primary ground motion along a north-south axis. There is a consistency in the cracking patterns, which is also consistent with the lean of the walls.

The main threats to the structure, prior to the stabilization, seismic retrofitting and restoration remains another seismic event.

5.4.5 Frame and Partition Walls

There are several stud frame partition walls on the second floor as well as a small part of a plank frame wall. There is also a stud frame wall on the first floor for the bathroom on the east side of the south room, Room 104. Several of the second floor stud frame walls were utilized to support the second floor joists. Steel rods were attached to the underside of the joists in Room 102 and 103 and extended through the second floor walls to the attic. There the steel support rods were supported by a modification to the roof framing system.

The partial plank partition wall was part of an original plank partition that extended the width of the second floor. The part that remains is not in its precise original location and may have been further modified as they were reused. The specific details of this partition are discussed in another section of this report.

5.4.6 Roof System

The present roof system over the two-story portion of the structure appears original with significant later modifications to support the steel rods supporting the second floor joists mentioned above. The original framing system was simple consisting of rafters on 36 inch centers with 1 inch and two-inch thick horizontal ties, or collar beams. The collar beams were paired. A wood gusset plate or an upper horizontal tie serving the same purpose as the gusset was attached to each rafter. The lower collar beams were 34 to 35 inches below the apex of the roof. There is no ridge beam and the rafters are simply butt-nailed end to end. There are also no original sheathing boards as all have been replaced. The slope of the roof is 4 inches in 12 inches.

The rafters rest on a wall plate located on the exterior part of the adobe walls. The space between the rafters are filled with adobes, plastered and whitewashed. The wall plate is approximately 3 ½ inches thick and 6 inches wide and is joined by simple lap joints. Figure 5.10 is a photograph and a sketch of this connection.

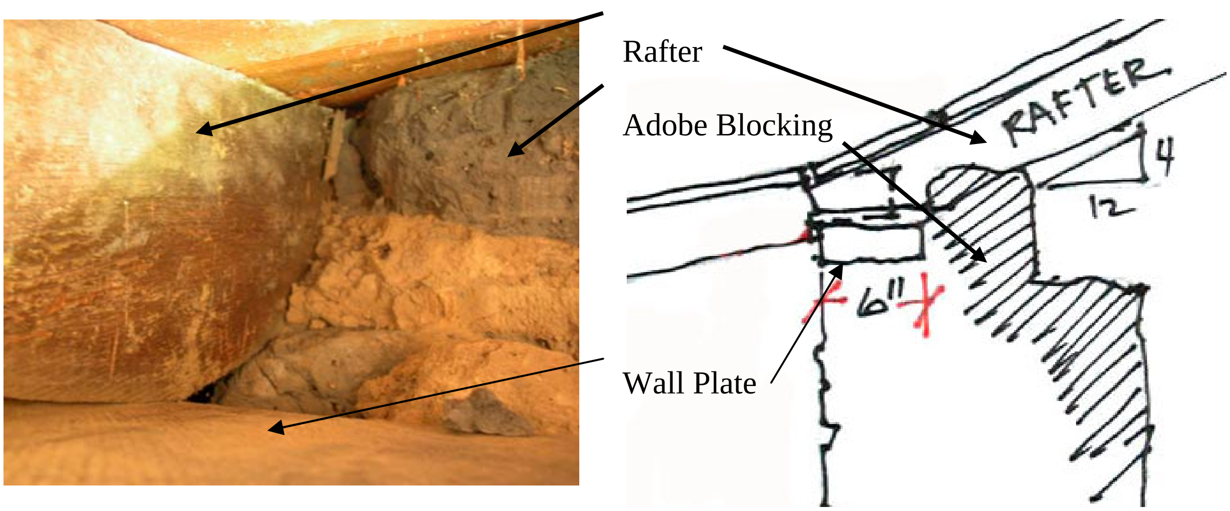

Figure 5.10: Details of the wall plate and rafter connection.

The modification to the roof to carry the load of the second floor via the steel support rods is a heavy timber truss. The steel rods are actually connected to a heavy timber plate that is supported by the lower cord of the truss. Diagonal web members are attached to the rafters by steel plates. Figure 5.11 is a photograph of a detail of the support system.

Figure 5.11: A detail of the roof system that supports the second floor. Digital photograph by A. Crosby, April 2003.

5.4.7 Ceiling and Floor Systems

The first floor ceiling system of the structure appears to be original. Several replacement ceiling boards were identified, and others have been severely sand blasted. Others may have been reused, but they are relatively few. The dimensions of the ceiling boards and the joists vary somewhat. The ceiling and second floor is supported by beaded joists spanning the ceiling nearly 22 feet. The joists slope from west to east an average of 5 inches. Figure 5.12 is a sketch showing the slope of the ceiling and floor.

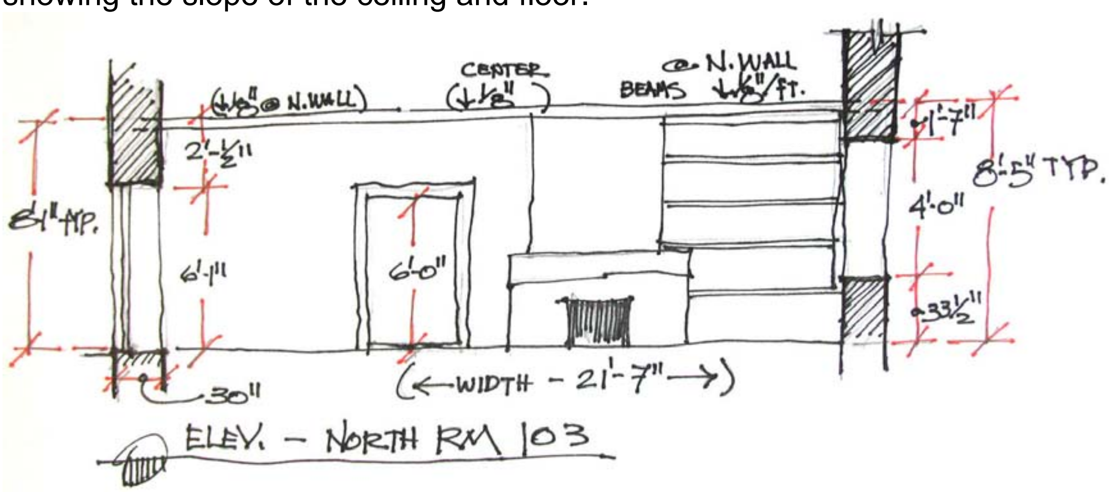

Figure 5.12: Field sketch of a section through Room 103 looking south showing the 4-5 inch slope from west to east.

The floor of Room 204, the south room on the second floor slopes from north to south 3 inches. This is probably at least partially attributed to the deformation of the south exterior wall.

The floor of Room 103 has a crown in the center of the room and the floor slopes both to the west and east from the high point. The actual slope was measured to be between one and two inches in the center of this room.

Ceiling heights on the first floor were determined only in Room 103. They varied between 8'-0" to 8'-6" on the first floor, the result of the slope in the floor and the ceiling. Ceiling heights on the second floor currently between 8'-1 ½" to 8'-4". The original ceiling was approximately 6-7 inches higher.

The second floor ceiling is a complete replacement, although many early boards were used, either from the earlier ceiling or from another structure. The original ceiling was attached to the underside of the roof rafters and then to horizontal cross members so that the upper part of the ceiling was flat. The present ceiling is also this same basic configuration, but the sloped portion is shorter as the ceiling boards do not extend as high on the rafters and the flat part, consequently is wider. Many of the original horizontal members remain in place to indicate the actual height of the original ceiling. The rafters and other roof and ceiling members were whitewashed after the original ceiling was removed. Figure 5.13 shows a view of the attic and the typical conditions.

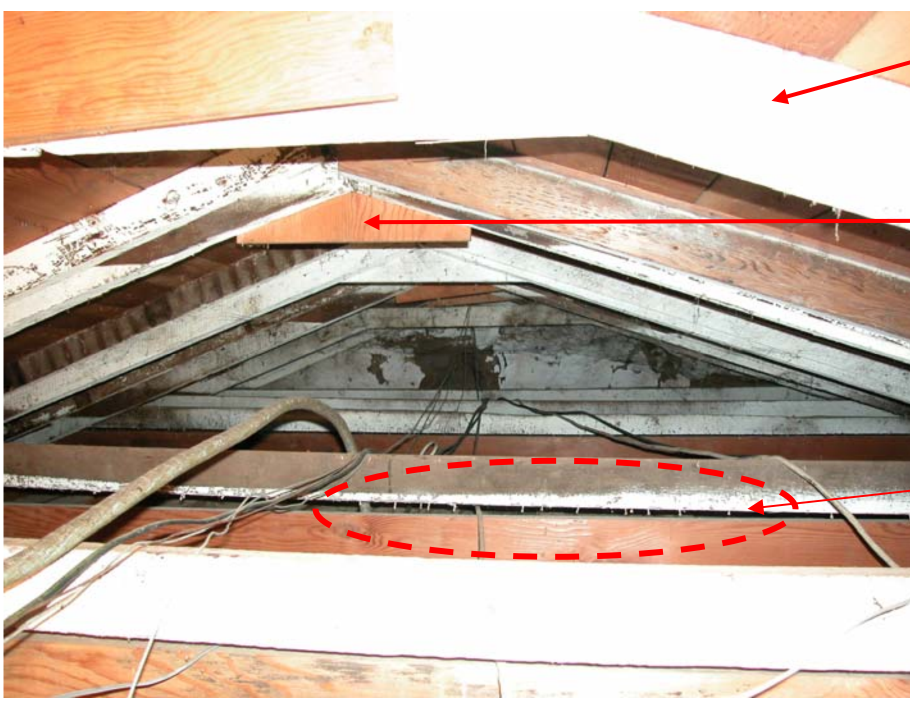

Figure 5.13: Typical condition in the attic. Digital photograph by A. Crosby, April 2003.

5.4.8 *Corredores*

It has been mentioned in other sections of this report as well as previously in this section 5 that the east and west corredors are 20th century replacements. Considerable time has been spent in determining the original conditions. There are several functional problems that exist currently. The major concerns that are elaborated on here are the height of the existing ceiling and the height of the balustrade on the east elevation. From a study of historic photographs, it appears that the original corredor eave was higher than it is currently. It also appears that the balustrade was also higher than the current balustrade. Figure 5.14 is a field sketch section of the east corredor.

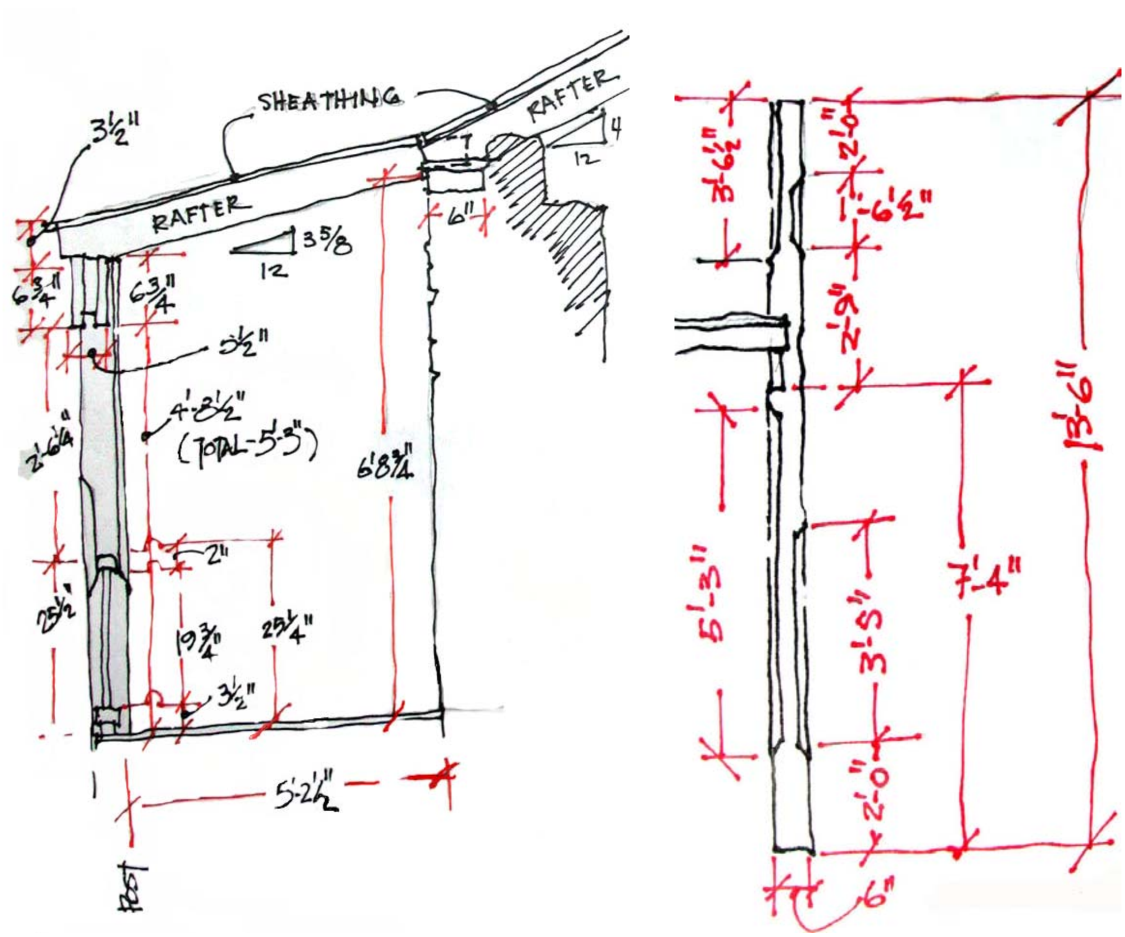

Figure 5.15: Field sketch of the east corredor and supporting posts.

The overall ceiling height at the adobe wall is 6'-8 ¾", but only 5'-3" to the underside of the rafter at the outer edge of the corredor. The lintel extends down another 6 ¾ inches to a clearance of only 4'-8 ½". Not only does this present a safety problem, it also restricts the view from the second level balcony.

The current balustrade is only 25 ¼" high and clearly considerably lower than the original. Because of the low height at the posts, a higher balustrade would look completely out of proportion to the overall character of the corredor.

The slope of the corredor roof is only slightly flatter than that of the main roof at 3 5/8 inches in 12 inches compared to 4 in 12 for the main roof. The corredor roof rafters are replacements, but they appear to be attached similarly to the originals. The recommendation part of this section of the HSR makes recommendations for resolving these problems and a possible solution is discussed here.

The current corredor rafter is notched at the wall plate rather than bearing on the plate with its full rafter dimension. This was necessary to insure than the actual break in the roof slope was at the exterior wall plane. This was probably the original system as well. If the rafters were raised approximately 3 inches, the break in the roof would be approximately one foot higher on the roof. This would be a change from the original system, but it would not be easily noticeable. In addition, if the slope of the roof was flattened slightly to 3 in 12, rather than 3 5/8 in 12, anther 2 to 3 inches in height could be gained. Other possibilities might be to move the break in the roof slope even more, flatten the corredor roof, decrease the size of the rafters from the current 5 ¾ inches, and increase the slope of the porch slightly. A more dramatic approach would be to raise the main roof several inches. The specific details will have to be worked out in the design phase.

The existing posts of both the east and west corridors are consistent with the details of ca. 1890 replacement posts, but are different than the original posts. The asymmetrical chamfering of the current post is unusual and did not exist on the original posts. The posts in the historical photograph also appear to be thicker than the current 6-inch current posts. A survey of all existing posts was undertaken in order to determine if any earlier, original posts exist. Several posts had been reused in the west wall of the cocina and on the west corredor. There were also several posts in the storage shed located immediately north of the Castro Adobe. Figure 5.16 is a photograph of the posts located in the storage shed.

Figure 5.16: Corredor posts in the storage shed that previously existed on the east corredor. Digital photograph by A. Crosby, April 2003.

These four posts retain evidence of the east corredor balustrade and are consistent in size. The height is the same as that of the current posts and the balustrade is also the same. This indicated that the ca. 1900 alterations were accurately replicated in ca. 1960.

Of the four posts in the east wall of the cocina, two have the same details as the four posts in the shed and the current corredor posts. The two posts on either side of the cocina doors, however, are different and may well be the only remaining physical evidence of the original corredor posts. Figure 5.17 is a field sketch of several of the posts that were documented. They are slightly larger, 6 ¾ inches compared to the existing of 6 inches and are symmetrically chamfered. The height also seems appropriate for the east corredor posts. There is other evidence that that under closer investigation may clarify other questions of original details. The additional investigation will require the removal of the posts from the wall, which was beyond the scope of this effort.

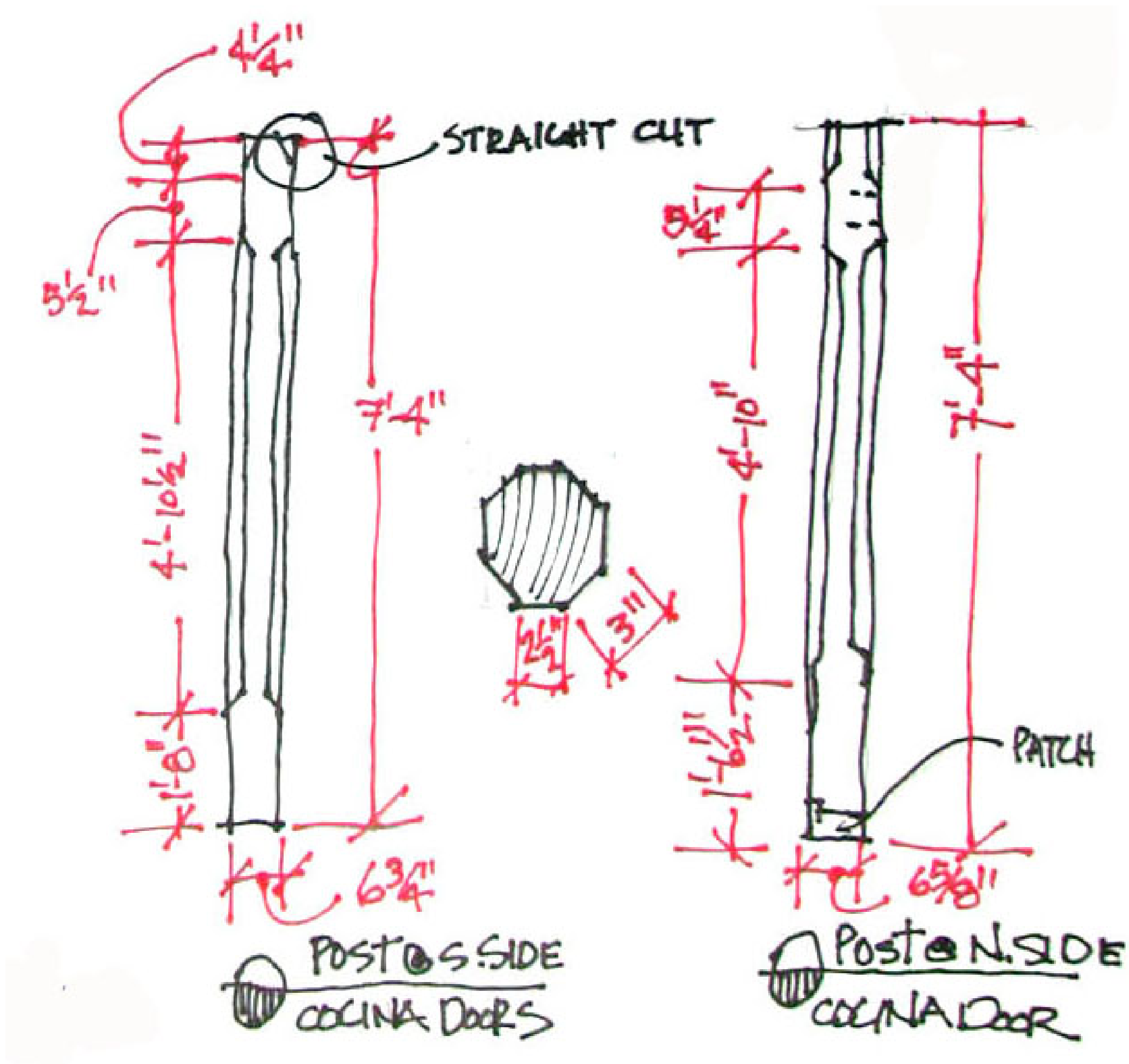

Figure 5.17: Two posts in the east wall of the cocina that might be from the original corredor.

5.4.9 Windows and Doors

There exists a variety of window sashes that represent original differences as well as later changes, There are also several replacement doors and door alterations that currently exist. All of these and additional changes and conditions are discussed in other sections of this report. A comprehensive door and window schedule is utilized to present the most critical information.

5.4.10 Surfaces

The structure has a combination of surface treatments, both historic and contemporary, which has been described previously. An initial cursory paint examination has identified the relationships of various building details as well as providing critical information about the original configuration of these same features. This initial examination was necessary in order to define a more comprehensive future paint study that will be critical for the restoration of the structure. The information is incorporated in other sections of this report.

5.5 RECOMMENDATIONS

5.5.1 Site

There are no specific recommendations for the site that are directly related to the preservation of the structures. Other factors, such as the interpretation and use of the gardens, the historic significance, and other non-historical values will be addressed in other parts of this document.

5.5.2 Adobe Wall Systems

The recommendations for the adobe walls emphasize the sections of the structure that have been damaged by the earthquake, or have otherwise been severely compromised. Some sections that have collapsed will have to be replaced. Other sections have been damaged to the extent that they will have to be removed. Still other sections that appear to be severely damaged can be repaired and can be saved. These conditions are described specifically in the following recommendations.

- <u>Undertake an engineering study for future seismic retrofitting of the structure</u>. A structural evaluation is a part of this HSR. The next step is a comprehensive study leading to construction documents for the seismic retrofitting of the structure. The structural design must also incorporate changes and alterations to the structure necessary for the restoration of the structure to its period of interpretation.

- <u>Replacement adobes should be similar in size and material to the originals.</u> A tendency to use stabilized adobes in the wall mall must be avoided, as they are not compatible with the originals and could result in differential erosion and damage. An exception would be if a lengthy part of the base of a wall had to be replaced for its entire thickness. Original soils are available at the south end of the building.

- <u>Reconstruct the northwest corner of the cocina, Room 101</u>. The reconstruction is necessary because of the severe damage of this part of the structure. It will require the partial removal of a short section of the west wall immediate next to the corner as well as a short portion of the north wall.

- Repair the northeast corner of the cocina. The northeast corner does not have to be removed and can be repaired in place. There is one section, a plug of one to two cubic feet of adobe masonry that has shifted in place and will have to be reset into the adobe mass. Other structural cracks at the corner can be grouted and in some cases stitched back together with some new unamended adobes. The seismic retrofit system will further provide the necessary stability to this corner.

- Replace the lower part of the north wall. The lower part of this wall from the approximate centerline to the northwest corner has shifted horizontally away from the main wall plane. It may be possible to support the upper part of the wall above the horizontal crack and then move the shifted part back into place. Moving the shifted part back may cause additional damage to the remainder of the wall. Through-pinning the wall approximately every 3 feet can support the upper portion. The lower part can then be removed and then the replacement part constructed. Depending on the condition of the foundation a new partial foundation may be required. The lower several courses should be constructed of stabilized adobes.

- Reconstruct the south gable wall that collapsed with adobes. The design of the seismic retrofit will dictate the details of the reconstruction.

- Repair the existing lower part of the south exterior wall. Because of the existence of a furred interior wall and protective plastic sheathing on the exterior, an evaluation of this wall was not undertaken. Further evaluation by the structural engineer and the details of the seismic design will determine how the wall is to be repaired. It may be determined that the wall is beyond repair and it or portions of it mayl have to be replaced.

- Remove the north exterior board and batten siding and the interior wire mesh stucco for further evaluation of the north two-story adobe wall. The exterior siding and the interior non-significant wire mesh prevented a comprehensive evaluation of this wall.

- Repair or replace the two-story north gable end. The specific action is dependent on the finding of the more comprehensive inspection and the seismic design.

- Repair the east and the west exterior adobe walls. These two long walls have been damaged by the earthquake, but not so severely that they cannot be repaired. Repair will consist of grouting with a compatible material with low pressure and minor stitching of some of the more severe cracks. The stitching may not be necessary, but is dependent on the seismic design.

5.5.3 Corredors

- Replace the east corredor posts and roof system. The roof system, the supporting posts, the balustrade and the lintel details are not appropriate. Alternatives are discussed in another part of this section. The posts were slightly larger and shaped differently than the current posts. Remnants may still exist in the east exterior wall of the cocina.

- Raise the existing corridor roof pitch and the west ends of the rafters for a higher clearance on the second floor.

- Replace the existing balustrade. The current one is far too short and is a safety hazard. The original balustrade was taller.

- Replace the west wall corridor posts. These posts are also incorrect and should be replaced with the same general design that will be used in the replacement of the east corridor posts. The existing rafter and later replacements should be retained in place and be part of the restoration.

5.5.4 Roof System

- As part of the retrofit engineering, undertake an engineering study of the roof system. It appears that at a minimum, the connections of the roof-framing members are suspect. In addition, the extent of termite damage must be analyzed to determine the possible loss of structural load carrying capacity in the roof members.

- Remove components of the large timber trusses that suspend the second floor. The joists cannot support the current or future loads and a new support system will have to be designed and implemented.

- Undertake a comprehensive termite inspection. A termite inspection for the purpose of determining the extent of damage to structural wood members should be carried out for the entire building. This inspection should be coordinated with the engineering inspection to determine the possible loss of structural capacity to frame, roof and floor elements. Replacement of wood elements should be coordinated with the conservation scope for the entire building. If replacement is required, the new element should match the original wood in species, dimensions, and finish and be date marked.

5.5.5 Windows and Doors

- Repair all existing doors and windows that are appropriate to the period of restoration. The specific investigation and the corresponding findings are included in other sections of this report. Several doors and windows are not appropriate and will have to be replaced. One door opening, the south end of the west exterior wall was probably a window originally and should be replaced with a window that matches others in the west wall. Another door between Rooms 101 and 102 did not exist historically and weakens the adobe wall.

5.5.6 Fireplaces

- Remove the existing fireplace on the first floor and the chimney system. This later addition is not appropriate and should be removed.

5.5.7 Surfaces

- Remove the wire-mesh lath and plaster on the interior wall surfaces. These late additions are inappropriate for this historic building. They also hide important historic information that should be preserved such as the wall graffiti.

- Conserve the graffiti on the interior and exterior wall surfaces. The graffiti are important records and part of the structure's history. The graffiti that is in good condition such as some on the exterior surface of the east wall has been protected by whitewash and the corridor roof. Any plaster repair and replacement should protect the graffiti. It can be protected in other areas on the interior by white washing over. Loose and friable may require consolidation prior to the application of the final surface treatment. Paint or whitewash should be drastically thinned over the graffiti so that it will not be obscured.

5.5.8 Miscellaneous

- Replace south portion of the east wall of the cocina. A portion of the east wall of the cocina was reconstructed with stabilized adobes and is different in character of the historic period wall. The design of the new wall will have to incorporate elements that define the historic character with the functional needs of the area and the wall, specifically.

- Install hardware cloth stapled in place at the base of the cocina walls. To prevent continued damage due to ground squirrel and gopher burrowing at the base of the cocina walls

5.7 REFERENCES

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Torraca, Giorgio. Porous Building Materials, Materials Science for Architectural Conservation. International Centre for the Study of the Preservation and the Restoration of Cultural Property. First Edition. Rome 1981

5.7.1 Personal Communication

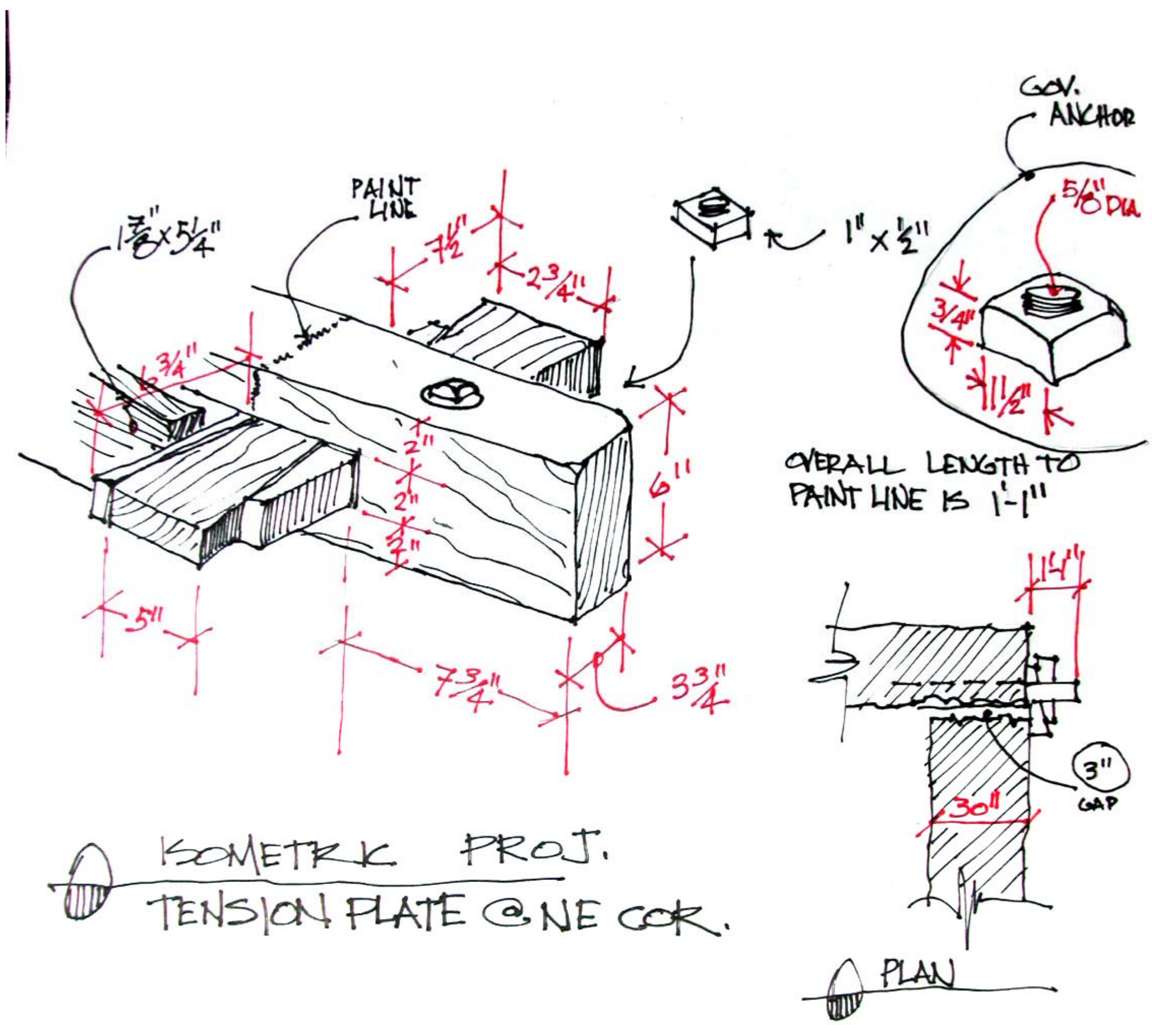
Hildebrand, Karen. State Archeologist, Monterey District, Department of Parks and Recreation, State of California.

Kimbro, Edna. State Historian II, Monterey District, Department of Parks and Recreation, State of California

MacKenzie, James. Preservation Specialist, Monterey District, Department of Parks and Recreation, State of California

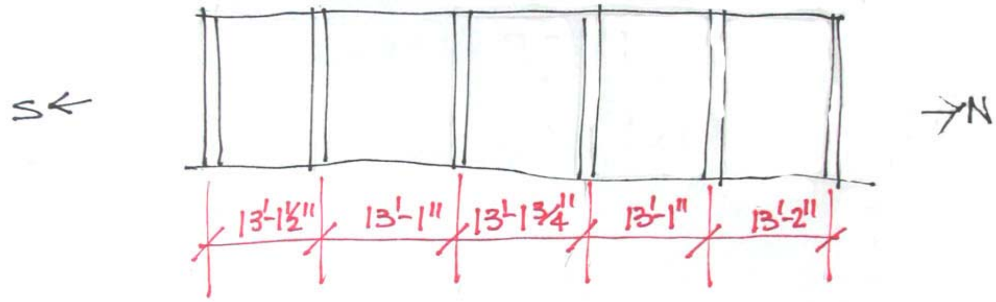
5.6 APPENDICES

5.6.1 Field Notes

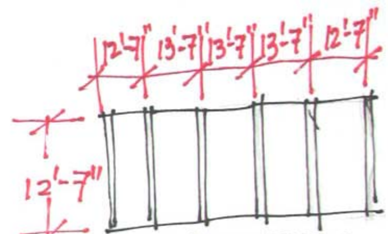


CASTRO ADOBE
WATSONVILLE
APRIL 4, 2003
T. CROSBY

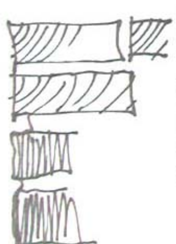
CASTRO ADOBE
WATSONVILLE, CA.
APRIL 4, 2003
T. CROSBY



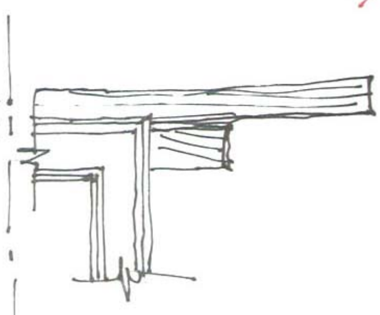
EAST ELEV - PARTIAL
COLUMN SPACING



WEST ELEV.
SPACING



SECTION
DOOR



ELEV.
DOOR

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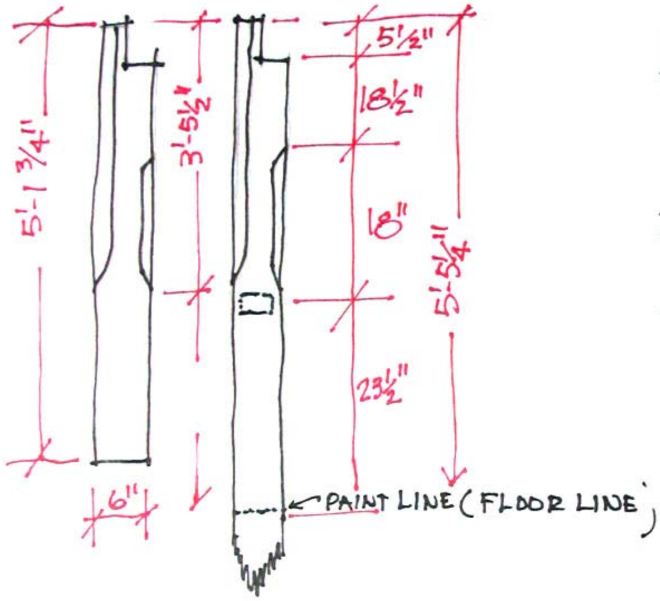
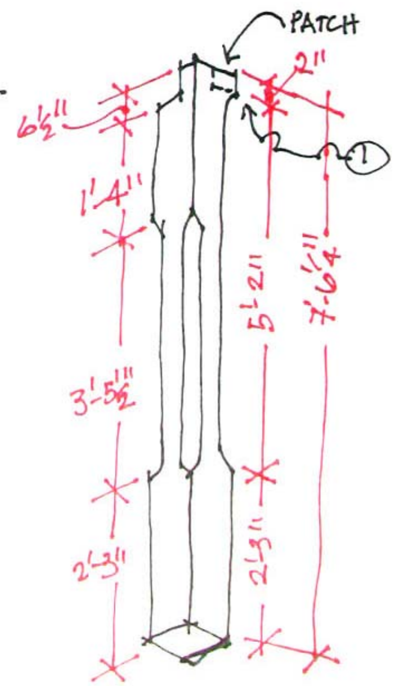
NOTE:

1. ALL PAINTED PALE GREEN
2. 4 POSTS VARY FROM 4'-4" LONG TO 5'-5 1/4"
3. THESE ARE ALL FROM EAST SIDE, 2ND FL. LEVEL
4. POSTS ON WEST SIDE (PARTIAL) ARE THE SAME. SEE BELOW.



FOUR POSTS - ELEV.
(STACKED IN SHED)



POST AT WEST WALL N. END OF ROOF
(1) CHAMFER ENDS ABOUT 1" LOWER THAN TOP OF POST

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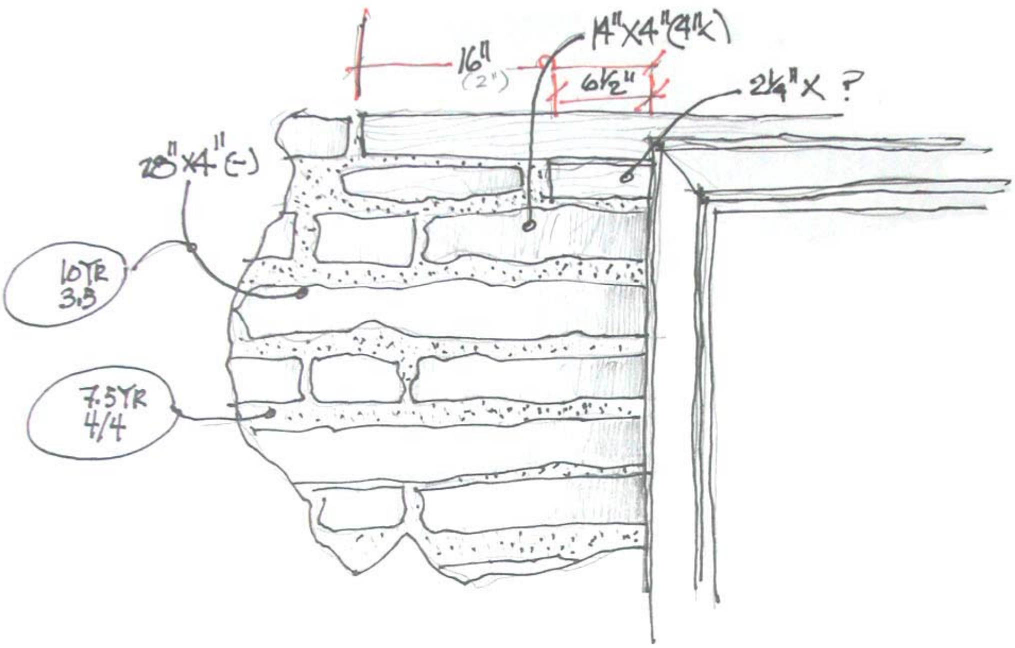
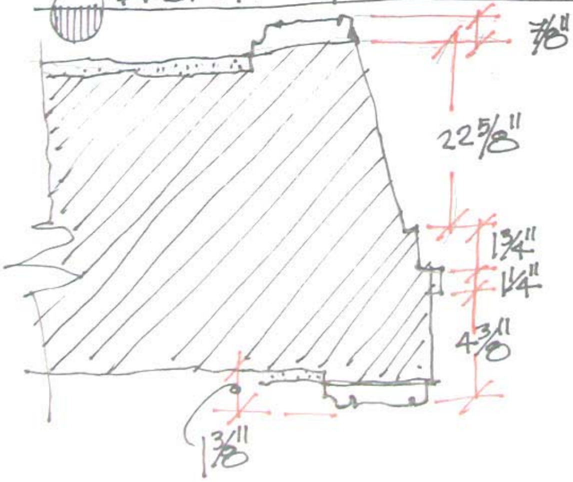


ELEVATION DOOR # 102



PLAN - DOOR # 102

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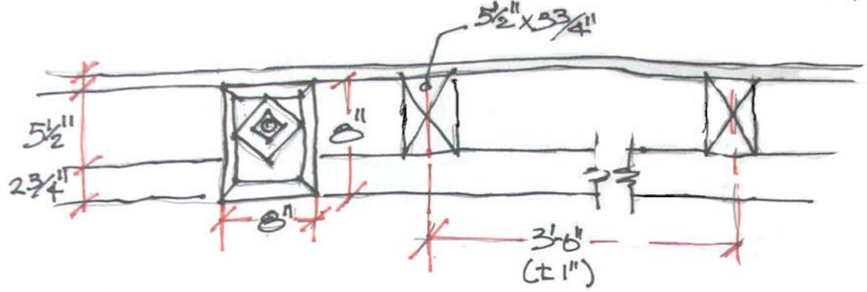
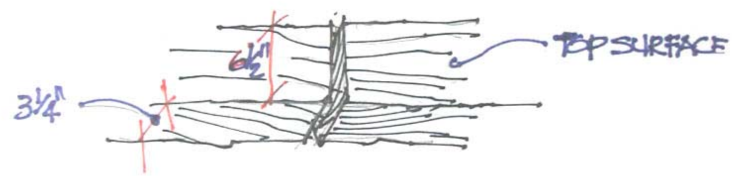
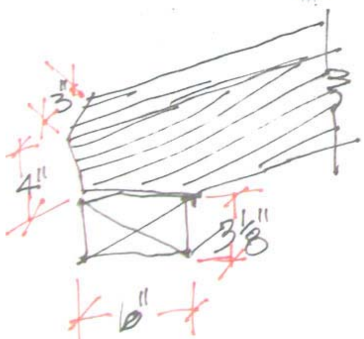


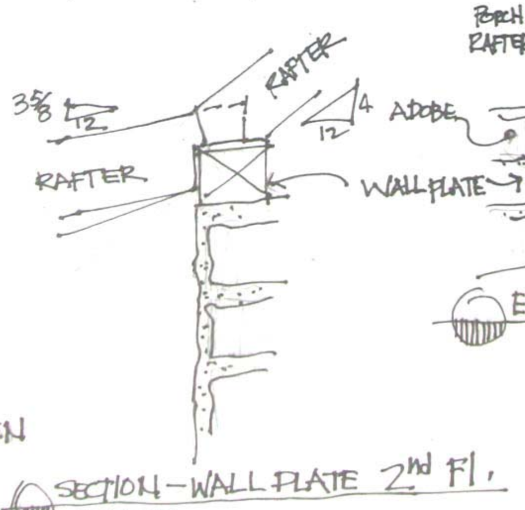
ELEVATION 2nd FL. LEVEL
NORTH ELEVATION



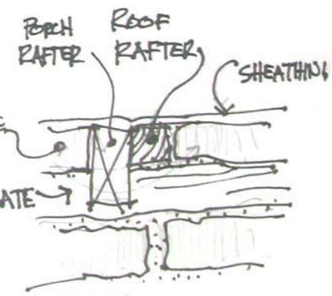
WALL PLATE @ STAIR INT.; 1st FL.
NORTH WALL INT.



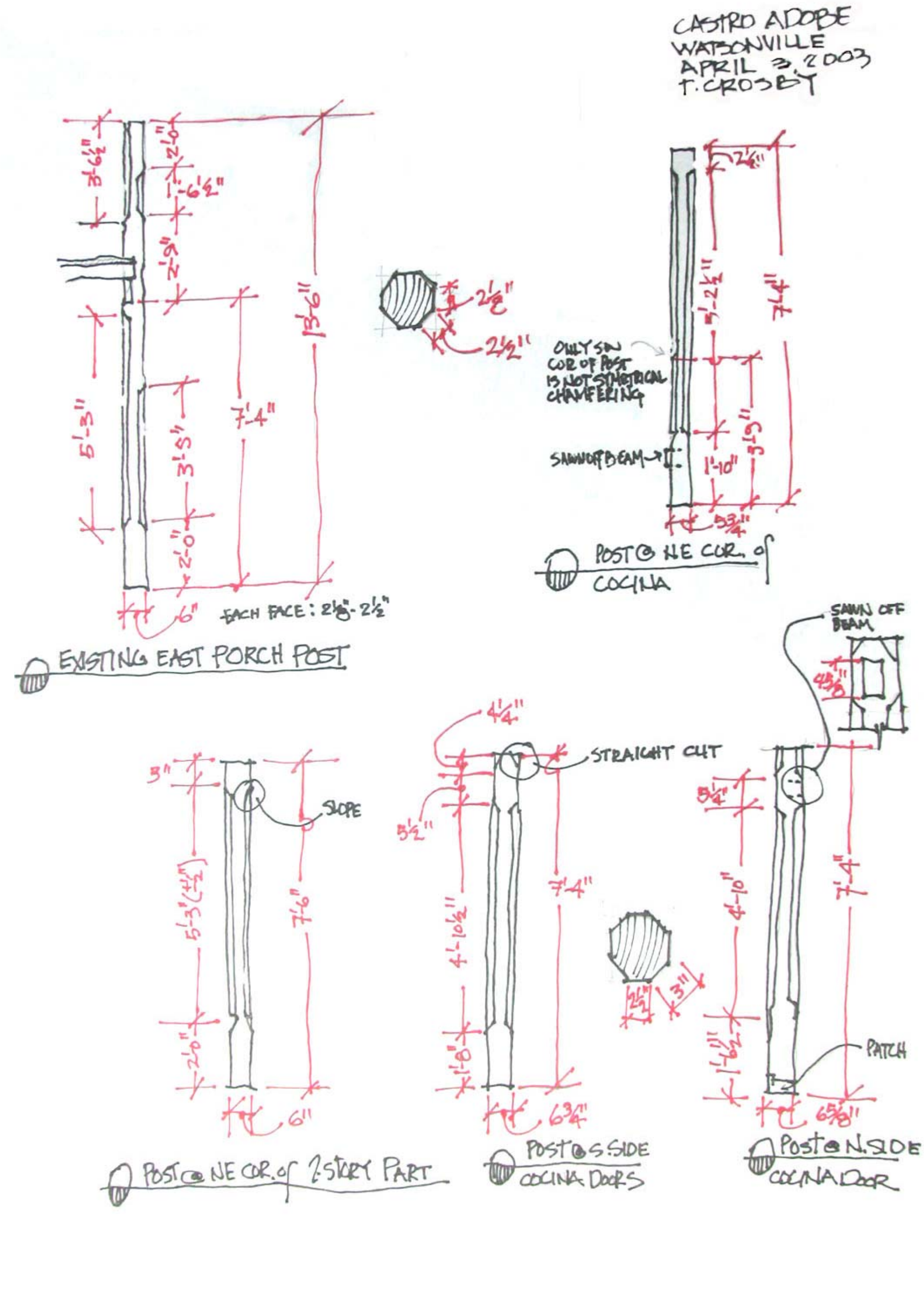
TYP. CONNECTION
2nd FL; RAFTER/PLATE
NORTH SIDE; BETWEEN
W6 & W7.



SECTION - WALL PLATE 2nd Fl.
TYPICAL



ELEV.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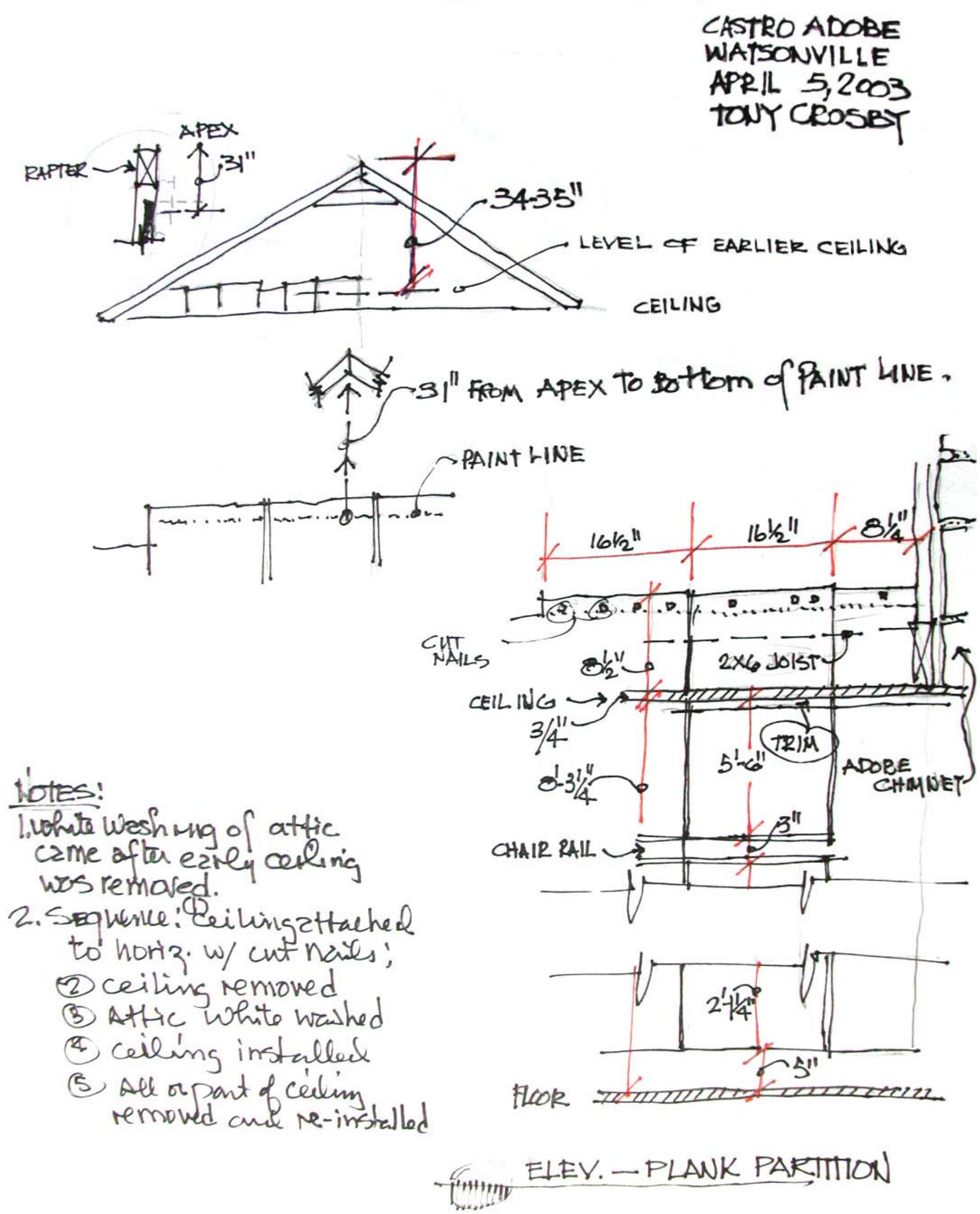
EXISTING EAST PORCH POST
EACH FACE: 2⅛"-2½"
13'-6"
7'-4"
5'-3"
3'-5"
2'-0"
2'-9"
3'-6½"
6"
2½"
ONLY SW COR OF POST IS NOT SYMETRICAL CHAMFERING
SAWN OFF BEAM
POST @ NE COR. of COCINA
7'-4"
5'-2½"
3'-5"
1'-10"
5¾"
SLOPE
3"
5'-3" (7'-4")
7'-6"
2'-0"
6"
POST @ NE COR. of 2-STORY PART
4¼"
STRAIGHT CUT
5½"
4'-10½"
7'-4"
1'-8"
6¾"
3"
POST @ S. SIDE COCINA DOORS
SAWN OFF BEAM
5¼"
4'-10"
7'-4"
PATCH
6⅝"
POST @ N. SIDE COCINA DOOR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APEX
RAFTER
31"
34-35"
LEVEL OF EARLIER CEILING
CEILING
31" FROM APEX TO BOTTOM OF PAINT LINE.
PAINT LINE
16½"
16½"
8¼"
CUT NAILS
8½"
2X6 JOIST
CEILING
3/4"
TRIM
5'-6"
ADOBE CHIMNEY
8'-3¼"
3"
CHAIR RAIL
2'-1¼"
5"
FLOOR
ELEV. — PLANK PARTITION
NOTES:
1. white washing of attic came after early ceiling was removed.
2. Sequence: ① ceiling attached to horiz. w/ cut nails;
② ceiling removed
③ Attic white washed
④ ceiling installed
⑤ All or part of ceiling removed and re-installed

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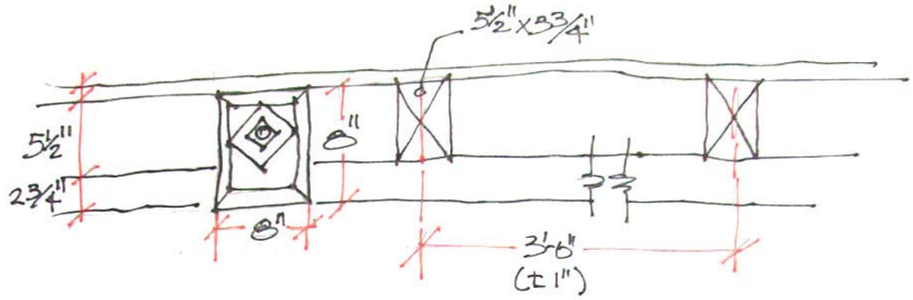
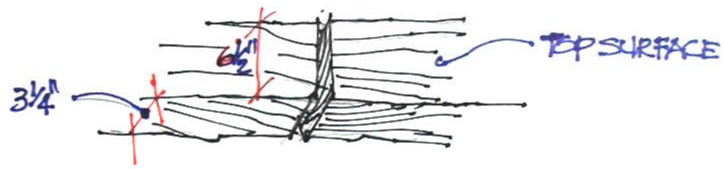
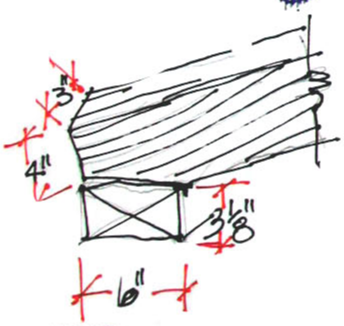


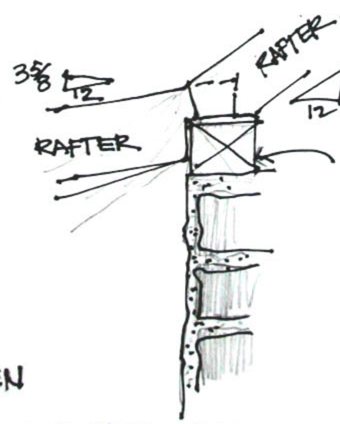
ELEVATION 2nd FL. LEVEL
NORTH ELEVATION



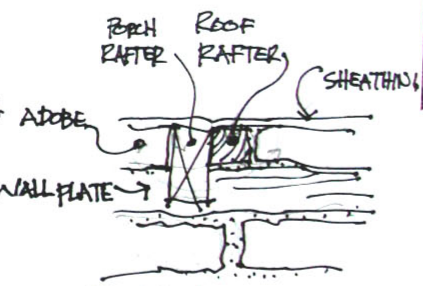
WALL PLATE @ STAIR INT.; 1ST FL.
NORTH WALL INT.



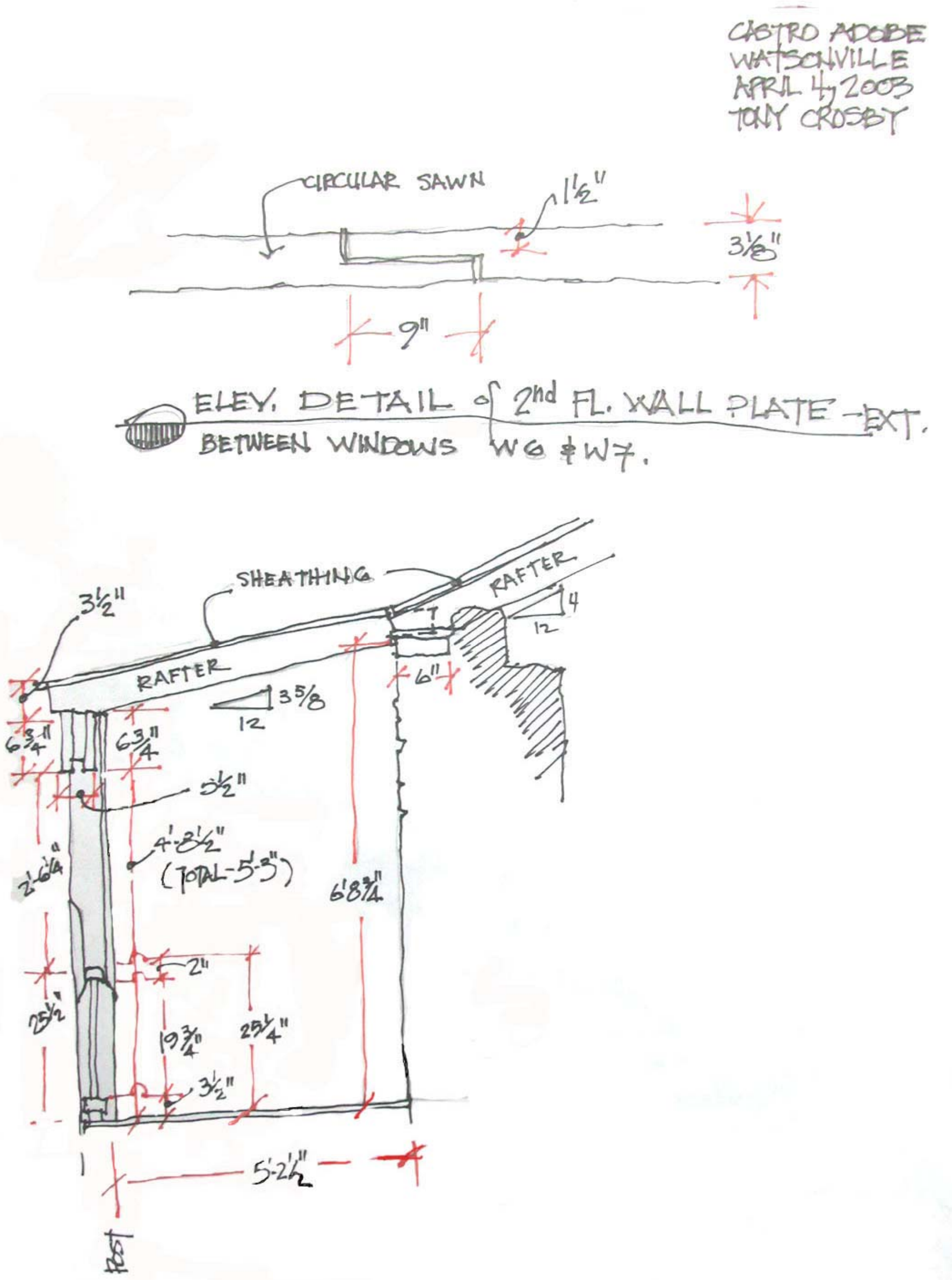
TYP. CONNECTION
2nd FL; RAFTER/PLATE
NORTH SIDE; BETWEEN
W6 & W7.



SECTION - WALL PLATE 2nd FL.
TYPICAL



ELEV.


CASTRO ADOBE
WATSONVILLE
APRIL 4, 2003
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CIRCULAR SAWN
1½"
3⅛"
9"
ELEV. DETAIL of 2nd FL. WALL PLATE - EXT.
BETWEEN WINDOWS W6 & W7.
SHEATHING
RAFTER
RAFTER
4
12
3½"
3 5/8
12
6"
6¾"
6¾"
5½"
4'-8½"
(TOTAL - 5'-3")
2'-6¼"
6'8¾"
2"
25½"
19¾"
25¼"
3½"
5'-2½"
POST